PROJECT PROGRESS REPORT

PREPARED FOR THE ALASKA ENERGY AUTHORITY
BY THE ALASKA CENTER FOR ENERGY AND POWER

PROJECT TITLE: Emerging Energy Technology Fund – Data Collection

COVERING PERIOD: 3rd Quarter 2013

DATE OF REPORT: December 1, 2013

GRANT RECIPIENT:
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Project #001 – Alaska Applied Sciences, Ammonia Synthesis

No work has been completed for this project during this quarter. ACEP is monitoring project pre-grant activities and communicating with AEA as to the status of the grant. If pre-grant activities are successfully completed and AEA approves further project activities, ACEP will be coordinating with AASI per the data collection plan on preliminary instrumentation review, specification, purchase, and installation for preliminary device demonstration.

Project #003 – Alaska Division of Forestry, Biomass Reforestation

Activity this quarter has been minimal. After a difficult field season, the project is currently undergoing review with AEA to determine either projection termination or a revision of the project SOW. ACEP is monitoring these activities to determine next steps specific to data collection. Currently, ACEP data loggers are in the field and collecting ground temperatures from the original planting sites. ACEP has not received field notes from project activities this summer. ACEP does have some temperature data sets retrieved during field activities this summer. ACEP is currently reviewing the data for quality assurance.

Project #006 – Arctic Sun, Arctic Thermal Shutters and Doors

ACEP conducted a site visit to Arctic Sun on 10/22 to review construction and instrumentation of the project test chamber. The following photos are from this site visit:


At the time of the site visit, construction of the test chamber was nearly complete; the project team was finalizing wiring and electrical work interior to the chamber. Instrumentation consists of two data logging systems, and exterior system (pictured in the first two photos) and an interior system (not pictured, but is routed through conduit from the interior of the chamber to the interior of the Arctic Sun office building). The exterior system primarily measures environmental conditions (temperatures, wind information, etc.) while the interior system primarily measures temperature of the interior of the test chamber.

After the site visit, the project team worked with ACEP research engineers on calibration of the instrumentation, and developing protocols for transferring data to ACEP for storage and review. At the time of this report, the project had just launched data logging for the test chamber commenced testing and was anticipating submitting their first data set to ACEP soon. Activities next quarter will consist of review initial data from the project and conducting quality assurance and review. In addition, ACEP will conduct several site visits during initial testing and data collection next quarter.

Project #009 – Genesis, Ultra-Efficient Generators and Diesel-Electric Propulsion

Activities this quarter have focused on supporting Phase 1 efforts of the Genesis project. This has included the specification, procurement, and shipment of instrumentation, in particular a torque meter, to support project efforts. A site visit was planned this quarter to provide technical assistance with instrumentation installation and calibration, in addition to general project review. This site visit, anticipated in October, was postponed due to conflicting schedules and a delay in the shipment of instrumentation. ACEP is currently scheduling a site visit for next quarter to complete this effort, as well as receive data sets collected during project testing. Finally, ACEP has continued to provide feedback and technical advice to the project with regards to instrumentation, data collection, and analysis of Phase 1 efforts. This activity is anticipated to continue next quarter.

Project #026 – Cold Climate Housing Research Center, Ground-Source Heat Pump

The CCHRC system was successfully commissioned this quarter. The project team has been coordinating with ACEP with regards to instrumentation commissioning, calibration, and data transmission. As of this report, the project is regularly transmitting data to ACEP for storage and review. ACEP is currently reviewing collected data for quality assurance and analysis, which will be submitted next quarter to AEA. In addition, ACEP is continuing to work with the project as it is anticipated more instrumentation will be brought on line next quarter. ACEP is anticipating several site visits in support of this effort next quarter.

Project #028 – University of Alaska Fairbanks, Organic Rankine Cycle

Activities this quarter have focused on monitoring project activities, which have been slow. To date the project has constructed most of the test bed and has conducted some preliminary baseline testing and calibration. ACEP is scheduled to conduct a site visit early next quarter to review the instrumentation against the data collection plan, and to review initial baseline testing results.

Project #029 – University of Alaska Fairbanks, Exhaust Thimble

The project team commenced preliminary baseline testing to calibrate test bed instrumentation this quarter. The project team has requested assistance from ACEP with regards to one instrument in particular that has proven difficult to calibrate. From correspondence with the project team:

> "Due to the narrow gap at the intake, we were getting wild readings for airflow when we put anerometer "in" the annulus gap. We finally put the anerometer parallel with the edge of the outer annulus and procured stable readings. See attached picture. The velocity measured at the location shown in the picture is very low, with frequent measurements of 0. Other than encapsulating the outer annulus and having a single entryway for the air, right now not seeing how to get a good measurement of the airflow velocity/ air mass entering the annulus. It may be we take readings with this setup and see if the computer models agree."

The referenced picture is as follows:

ACEP is currently working with the project team to address this issue. In addition, activities next quarter will include a review of baseline testing data and preliminary test data.

Project #035 – Altaeros, Airborne Wind Turbine

Activities this quarter have focused on monitoring project progress and grant milestone completion. ACEP has communicated with the project by email to understand progress on turbine prototype development and testing, and to anticipate collaboration on instrumentation specification and review and data collection procedure development.

From the project team, it has been determined that initial prototype development and testing has gone well, and that the project team has progressed to developing and testing the Alaska prototype. In addition, site selection for eventual testing has been narrowed down to two sites, Delta Junction and Eva Creek, with testing to likely occur at Eva Creek pending FAA approval as support from GVEA has been secured. Once the team has finalized the Alaska prototype design (anticipated to be next quarter), ACEP will be back in touch to discuss the strategy for data collection with respect to the original data collection plan.

Project #037 – Oceana, Hydrokinetics

No work has been completed for this project during this quarter. ACEP is monitoring project pre-grant activities and communicating with AEA as to the status of the grant. In addition, the ACEP data collection team is monitoring discussions between the project and the Alaska

Hydrokinetic Energy Research Center with regards to barge design and construction, and Nenana test site use.

Project #043 – ORPC Alaska, Hydrokinetics

Activities this quarter have focused on monitoring project progress and grant milestone completion. ACEP has had some discussions with the project team concerning the work at Nikiski and TGU testing in Maine. In addition, ACEP has been in continued discussions with the project team concerning demonstration of power electronics at the ACEP Power Systems Integration Laboratory.

Project #045 – Hatch, Flywheel

The ACEP data collection team is monitoring discussions between the Hatch project and the ACEP Power Systems Integration laboratory with regards to testing plans, schedule, and protocols. A draft agreement has been developed between the two entities. It is anticipated that this agreement will be finalized next quarter, and pre-testing activities will commence in earnest In particular, the ACEP data collection team will collaboration with the PSI lab team to review data collection plans against the original data collection agreement, and to provide technical support when necessary.

Project #049 – Intelligent Energy Systems, Self-Regulated Grid, Project #051 – Intelligent Energy Systems, Wind-Diesel-Battery Hybrid System

ACEP has been jointly monitoring the two IES projects as they are still in the design and procurement phase. ACEP had initially planned a site visit to the two project locations this quarter, but based on feedback by the project team, has postponed this site visit. ACEP is currently investigating a site visit in January, as ACEP staff will be located in Bethel in support of other efforts. This site visit will review the installed systems and instrumentation for both projects.

AS a note, original plans for the pre-demonstration of a Steffes unit (Project #049) at the ACEP Power Systems Integration laboratory were determined to not be feasible or appropriate given the project scale, budget, and timeline. Instead, pre-demonstration activities are anticipated to take place at an electrical engineering laboratory on campus in association with faculty affiliated with the project team. ACEP will be monitoring this pre-demonstration.

Project #058 – BRI, Hydrokinetics

No work has been completed for this project during this quarter. ACEP is monitoring project pre-grant activities and communicating with AEA as to the status of the grant. If pre-grant activities are successfully completed and AEA approves further project activities, ACEP will be coordinating with BRI per the data collection plan on preliminary instrumentation review, specification, purchase, and installation for preliminary device demonstration.

Project #061 – Marsh Creek, Various Speed Diesel-Electric Generation

Activities this quarter have been minimal. ACEP was notified at the end of November that Marsh Creek was planning on progressing with the first stages of project design and development. ACEP is scheduled to hold a teleconference with the Marsh Creek project team before the Christmas break. It is anticipated that activities next quarter, in addition to meeting with the project team, will include a review of instrumentation and data collection protocols for Marsh Creek testing, and collaboration on developing a methodology for transmitting collected data to ACEP.